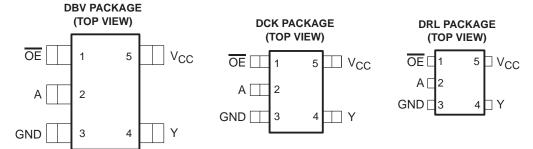
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- Operating Range of 4.5 V to 5.5 V
- Max t<sub>pd</sub> of 6 ns at 5 V
- Low Power Consumption, 10-μA Max I<sub>CC</sub>
- ±8-mA Output Drive at 5 V

- Inputs Are TTL-Voltage Compatible
- Latch-Up Performance Exceeds 250 mA Per JESD 17



See mechanical drawings for dimensions.

### description/ordering information

The SN74AHCT1G125 is a single bus buffer gate/line driver with 3-state output. The output is disabled when the output-enable  $(\overline{OE})$  input is high. When  $\overline{OE}$  is low, true data is passed from the A input to the Y output.

To ensure the high-impedance state during power up or power down,  $\overline{OE}$  should be tied to  $V_{CC}$  through a pullup resistor; the minimum value of the resistor is determined by the current-sinking capability of the driver.

#### ORDERING INFORMATION

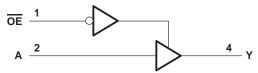
TA	PACKAGE	<u>:</u> †	ORDERABLE PART NUMBER	TOP-SIDE MARKING <sup>‡</sup>		
	00T (00T 00)	Reel of 3000	SN74AHCT1G125DBVR	DOE		
	SOT (SOT-23) – DBV	Reel of 250	SN74AHCT1G125DBVT	B25_		
–40°C to 85°C	SOT (SC-70) - DCK	Reel of 3000	SN74AHCT1G125DCKR	DM		
	301 (3C-70) - DCK	Reel of 250	SN74AHCT1G125DCKT	BM_		
	SOT (SOT-553) – DRL	Reel of 4000	SN74AHCT1G125DRLR	BM_		

<sup>†</sup> Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.

#### **FUNCTION TABLE**

INP	JTS	OUTPUT
OE	Α	Υ
L	Н	Н
L	L	L
Н	X	Z

### logic diagram (positive logic)





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<sup>&</sup>lt;sup>‡</sup> The actual top-side marking has one additional character that designates the assembly/test site.

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### absolute maximum ratings over operating free-air temperature range (unless otherwise noted)

Supply voltage range, V <sub>CC</sub>	0.5 V to 7 V
Input voltage range, V <sub>I</sub> (see Note 1)	–0.5 V to 7 V
Output voltage range, VO (see Note 1)	–0.5 V to $V_{CC}$ + 0.5 V
Input clamp current, I <sub>IK</sub> (V <sub>I</sub> < 0)	–20 mA
Output clamp current, I <sub>OK</sub> (V <sub>O</sub> < 0 or V <sub>O</sub> > V <sub>CC</sub> )	±20 mA
Continuous output current, $I_O$ ( $V_O = 0$ to $V_{CC}$ )	±25 mA
Continuous current through V <sub>CC</sub> or GND	±50 mA
Package thermal impedance, θ <sub>JA</sub> (see Note 2): DBV package	206°C/W
DCK package	252°C/W
DRL package	142°C/W
Storage temperature range, T <sub>stg</sub>	65°C to 150°C

<sup>†</sup> Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

### recommended operating conditions (see Note 3)

		MIN	MAX	UNIT
Vcc	Supply voltage	4.5	5.5	V
$V_{IH}$	High-level input voltage	2		V
$V_{IL}$	Low-level input voltage		0.8	V
٧ <sub>I</sub>	Input voltage	0	5.5	V
VO	Output voltage	0	VCC	V
ІОН	High-level output current		-8	mA
loL	Low-level output current		8	mA
Δt/Δν	Input transition rise or fall rate		20	ns/V
TA	Operating free-air temperature	-40	85	°C

NOTE 3: All unused inputs of the device must be held at V<sub>CC</sub> or GND to ensure proper device operation. Refer to the TI application report, *Implications of Slow or Floating CMOS Inputs*, literature number SCBA004.

# electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

DADAMETED	TEST COMPLETIONS		T,	ղ = 25°C	;	BAINI	BAAV	LINUT	
PARAMETER	TEST CONDITIONS	VCC	MIN	TYP	MAX	MIN	MAX	UNIT	
	$I_{OH} = -50 \mu A$	451/	4.4	4.5		4.4		.,	
VOH	I <sub>OH</sub> = -8 mA	4.5 V	3.94			3.8		٧	
V	I <sub>OL</sub> = 50 μA	45.77			0.1		0.1	.,	
$V_{OL}$	I <sub>OL</sub> = 8 mA	4.5 V			0.36		0.44	V	
lį	V <sub>I</sub> = 5.5 V or GND	0 V to 5.5 V			±0.1		±1	μΑ	
loz	$V_O = V_{CC}$ or GND	5.5 V			±0.25		±2.5	μΑ	
Icc	$V_I = V_{CC}$ or GND, $I_O = 0$	5.5 V			1		10	μΑ	
ΔI <sub>CC</sub> ‡	One input at 3.4 V, Other input at V <sub>CC</sub> or GND	5.5 V			1.35		1.5	mA	
C <sub>i</sub>	$V_I = V_{CC}$ or GND	5 V		4	10		10	pF	
Co	$V_O = V_{CC}$ or GND	5 V		10				pF	

<sup>‡</sup> This is the increase in supply current for each input at one of the specified TTL voltage levels, rather than 0 V or VCC.



NOTES: 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

<sup>2.</sup> The package thermal impedance is calculated in accordance with JESD 51-7.

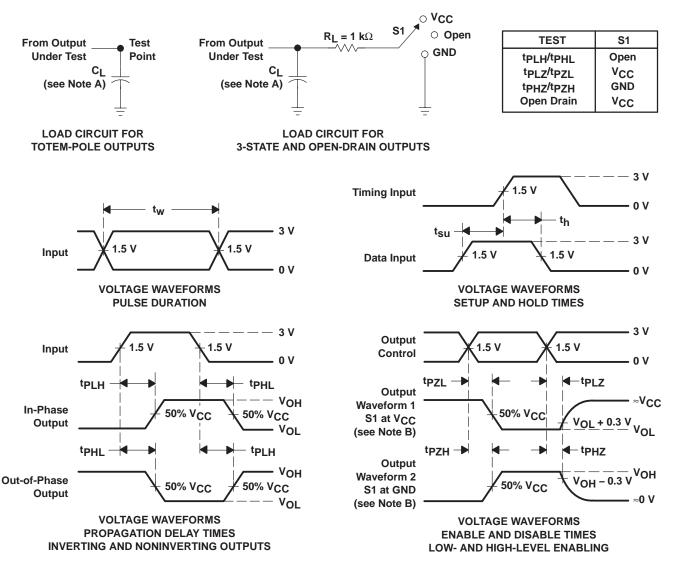
# switching characteristics over recommended operating free-air temperature range, $V_{CC}$ = 5 V $\pm$ 0.5 V (unless otherwise noted) (see Figure 1)

24244555	FROM	то	LOAD	T,	λ = 25°C	;			
PARAMETER	(INPUT)	(OUTPUT) CAPACITANCE		MIN	TYP	MAX	MIN	MAX	UNIT
tPLH		V	0. 45 = 5		3.8	5.5	1	6.5	
<sup>t</sup> PHL	А	Υ	C <sub>L</sub> = 15 pF		3.8	5.5	1	6.5	ns
<sup>t</sup> PZH	ŌĒ	Y	0. 45 = 5		3.6	5.1	1	6	
<sup>t</sup> PZL	OE	Y	C <sub>L</sub> = 15 pF		3.6	5.1	1	6	ns
t <sub>PHZ</sub>	ŌĒ	Y	C <sub>L</sub> = 15 pF		4.6	6.8	1	8	ns
t <sub>PLZ</sub>	OE .	Y	OL = 10 pi		4.6	6.8	1	8	115
<sup>t</sup> PLH			0 50 - 5		5.3	7.5	1	8.5	
t <sub>PHL</sub>	А	Υ	C <sub>L</sub> = 50 pF		5.3	7.5	1	8.5	ns
<sup>t</sup> PZH	ŌĒ		0 50 - 5		5.1	7.1	1	8	
tpzL	OE	Υ	C <sub>L</sub> = 50 pF		5.1	7.1	1	8	ns
<sup>t</sup> PHZ	ŌĒ	Y	C: - 50 pF		6.1	8.8	1	10	20
t <sub>PLZ</sub>	OE .	ſ	C <sub>L</sub> = 50 pF		6.1	8.8	1	10	ns

# operating characteristics, $V_{CC} = 5 \text{ V}$ , $T_A = 25^{\circ}\text{C}$

		PARAMETER	TEST C	ONDITIONS	TYP	UNIT
Г	C <sub>pd</sub>	Power dissipation capacitance	No load,	f = 1 MHz	14	pF

#### PARAMETER MEASUREMENT INFORMATION



- NOTES: A. C<sub>I</sub> includes probe and jig capacitance.
  - B. Waveform 1 is for an output with internal conditions such that the output is low, except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high, except when disabled by the output control.
  - C. All input pulses are supplied by generators having the following characteristics: PRR  $\leq$  1 MHz,  $Z_Q = 50 \Omega$ ,  $t_f \leq$  3 ns,  $t_f \leq$  3 ns.
  - D. The outputs are measured one at a time, with one input transition per measurement.
  - E. All parameters and waveforms are not applicable to all devices.

Figure 1. Load Circuit and Voltage Waveforms







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### **PACKAGING INFORMATION**

Orderable Device	Status	Package Type	_	Pins	Package Qty	Eco Plan	Lead/Ball Finish	MSL Peak Temp	Op Temp (°C)	Top-Side Markings	Samples
	(1)		Drawing			(2)		(3)		(4)	
74AHCT1G125DBVRE4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	(B253, B25G, B25J, B25L, B25S)	Samples
74AHCT1G125DBVRG4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	(B253, B25G, B25J, B25L, B25S)	Samples
74AHCT1G125DBVTE4	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	(B253, B25G, B25L, B25S)	Samples
74AHCT1G125DBVTG4	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	(B253, B25G, B25L, B25S)	Samples
74AHCT1G125DCKRE4	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	(BM3, BMG, BMJ, BML, BMS)	Samples
74AHCT1G125DCKRG4	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	(BM3, BMG, BMJ, BML, BMS)	Samples
74AHCT1G125DCKTE4	ACTIVE	SC70	DCK	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	(BM3, BMG, BML, BMS)	Samples
74AHCT1G125DCKTG4	ACTIVE	SC70	DCK	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	(BM3, BMG, BML, BMS)	Samples
74AHCT1G125DRLRG4	ACTIVE	SOT	DRL	5	4000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	(BMB, BMS)	Samples
SN74AHCT1G125DBVR	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	(B253, B25G, B25J, B25L, B25S)	Samples
SN74AHCT1G125DBVT	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	(B253, B25G, B25L, B25S)	Samples
SN74AHCT1G125DCKR	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	(BM3, BMG, BMJ, BML, BMS)	Samples
SN74AHCT1G125DCKT	ACTIVE	SC70	DCK	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	(BM3, BMG, BML, BMS)	Samples
SN74AHCT1G125DRLR	ACTIVE	SOT	DRL	5	4000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	(BMB, BMS)	Samples

<sup>(1)</sup> The marketing status values are defined as follows:

**ACTIVE:** Product device recommended for new designs.

**LIFEBUY:** TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

**PREVIEW:** Device has been announced but is not in production. Samples may or may not be available.

**OBSOLETE:** TI has discontinued the production of the device.



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### PACKAGE OPTION ADDENDUM

24-Jan-2013

(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.

**TBD:** The Pb-Free/Green conversion plan has not been defined.

**Pb-Free (RoHS):** TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

**Pb-Free (RoHS Exempt):** This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

(3) MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

<sup>(4)</sup> Only one of markings shown within the brackets will appear on the physical device.

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#### OTHER QUALIFIED VERSIONS OF SN74AHCT1G125:

Automotive: SN74AHCT1G125-Q1

NOTE: Qualified Version Definitions:

Automotive - Q100 devices qualified for high-reliability automotive applications targeting zero defects

### PACKAGE MATERIALS INFORMATION

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### TAPE AND REEL INFORMATION





	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

### QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



### \*All dimensions are nominal

Device	Package Type	Package Drawing		SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SN74AHCT1G125DBVR	SOT-23	DBV	5	3000	180.0	9.2	3.17	3.23	1.37	4.0	8.0	Q3
SN74AHCT1G125DBVR	SOT-23	DBV	5	3000	178.0	9.0	3.23	3.17	1.37	4.0	8.0	Q3
SN74AHCT1G125DBVR	SOT-23	DBV	5	3000	178.0	9.2	3.3	3.2	1.55	4.0	8.0	Q3
SN74AHCT1G125DBVT	SOT-23	DBV	5	250	178.0	9.2	3.3	3.2	1.55	4.0	8.0	Q3
SN74AHCT1G125DBVT	SOT-23	DBV	5	250	178.0	9.0	3.23	3.17	1.37	4.0	8.0	Q3
SN74AHCT1G125DCKR	SC70	DCK	5	3000	178.0	9.0	2.4	2.5	1.2	4.0	8.0	Q3
SN74AHCT1G125DCKR	SC70	DCK	5	3000	180.0	9.2	2.3	2.55	1.2	4.0	8.0	Q3
SN74AHCT1G125DCKR	SC70	DCK	5	3000	178.0	9.2	2.4	2.4	1.22	4.0	8.0	Q3
SN74AHCT1G125DCKT	SC70	DCK	5	250	178.0	9.2	2.4	2.4	1.22	4.0	8.0	Q3
SN74AHCT1G125DCKT	SC70	DCK	5	250	180.0	9.2	2.3	2.55	1.2	4.0	8.0	Q3
SN74AHCT1G125DCKT	SC70	DCK	5	250	178.0	9.0	2.4	2.5	1.2	4.0	8.0	Q3
SN74AHCT1G125DRLR	SOT	DRL	5	4000	180.0	9.5	1.78	1.78	0.69	4.0	8.0	Q3
SN74AHCT1G125DRLR	SOT	DRL	5	4000	180.0	8.4	1.98	1.78	0.69	4.0	8.0	Q3

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\*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74AHCT1G125DBVR	SOT-23	DBV	5	3000	205.0	200.0	33.0
SN74AHCT1G125DBVR	SOT-23	DBV	5	3000	180.0	180.0	18.0
SN74AHCT1G125DBVR	SOT-23	DBV	5	3000	180.0	180.0	18.0
SN74AHCT1G125DBVT	SOT-23	DBV	5	250	180.0	180.0	18.0
SN74AHCT1G125DBVT	SOT-23	DBV	5	250	180.0	180.0	18.0
SN74AHCT1G125DCKR	SC70	DCK	5	3000	180.0	180.0	18.0
SN74AHCT1G125DCKR	SC70	DCK	5	3000	205.0	200.0	33.0
SN74AHCT1G125DCKR	SC70	DCK	5	3000	180.0	180.0	18.0
SN74AHCT1G125DCKT	SC70	DCK	5	250	180.0	180.0	18.0
SN74AHCT1G125DCKT	SC70	DCK	5	250	205.0	200.0	33.0
SN74AHCT1G125DCKT	SC70	DCK	5	250	180.0	180.0	18.0
SN74AHCT1G125DRLR	SOT	DRL	5	4000	180.0	180.0	30.0
SN74AHCT1G125DRLR	SOT	DRL	5	4000	202.0	201.0	28.0

# DBV (R-PDSO-G5)

### PLASTIC SMALL-OUTLINE PACKAGE



- A. All linear dimensions are in millimeters.
  - B. This drawing is subject to change without notice.
  - C. Body dimensions do not include mold flash or protrusion. Mold flash and protrusion shall not exceed 0.15 per side.
- D. Falls within JEDEC MO-178 Variation AA.



# DBV (R-PDSO-G5)

### PLASTIC SMALL OUTLINE



- A. All linear dimensions are in millimeters.
- B. This drawing is subject to change without notice.
- C. Customers should place a note on the circuit board fabrication drawing not to alter the center solder mask defined pad.
- D. Publication IPC-7351 is recommended for alternate designs.
- E. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Example stencil design based on a 50% volumetric metal load solder paste. Refer to IPC-7525 for other stencil recommendations.



# DCK (R-PDSO-G5)

# PLASTIC SMALL-OUTLINE PACKAGE



NOTES: A. All linear dimensions are in millimeters.

- B. This drawing is subject to change without notice.
- C. Body dimensions do not include mold flash or protrusion. Mold flash and protrusion shall not exceed 0.15 per side.
- D. Falls within JEDEC MO-203 variation AA.



# DCK (R-PDSO-G5)

### PLASTIC SMALL OUTLINE



- A. All linear dimensions are in millimeters.
- B. This drawing is subject to change without notice.
- C. Customers should place a note on the circuit board fabrication drawing not to alter the center solder mask defined pad.
- D. Publication IPC-7351 is recommended for alternate designs.
- E. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Example stencil design based on a 50% volumetric metal load solder paste. Refer to IPC-7525 for other stencil recommendations.



# DRL (R-PDSO-N5)

# PLASTIC SMALL OUTLINE



- A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M—1994.
- B. This drawing is subject to change without notice.
- Body dimensions do not include mold flash, interlead flash, protrusions, or gate burrs.

  Mold flash, interlead flash, protrusions, or gate burrs shall not exceed 0,15 per end or side.
- D. JEDEC package registration is pending.



# DRL (R-PDSO-N5)

### PLASTIC SMALL OUTLINE



NOTES: A. All linear dimensions are in millimeters.

- B. This drawing is subject to change without notice.
- C. Publication IPC-7351 is recommended for alternate designs.
- D. Customers should contact their board fabrication site for minimum solder mask web tolerances between signal pads.
- E. Maximum stencil thickness 0,127 mm (5 mils). All linear dimensions are in millimeters.
- F. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC 7525 for stencil design considerations.
- G. Side aperture dimensions over—print land for acceptable area ratio > 0.66. Customer may reduce side aperture dimensions if stencil manufacturing process allows for sufficient release at smaller opening.



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